PRRT – Sturgeon

ReadME File for data collected from 2010-2012

Project # 5700034

Research culminated in the MS Thesis of Matthew Wegener:

REPRODUCTION OF SHORTNOSE STURGEON IN THE GULF OF MAINE:
A MODELING AND ACOUSTIC TELEMETRY ASSESSMENT

Data for this work have been provided on a thumb drive to NOAA-Fisheries.

Primary reference for re-creating datasets for this contract can be found in the final thesis file: C:\THESIS\Wegener thesis.docx or C:\THESIS\Wegener thesis.pdf

Data types include:

Data file extension	Type of data included
docx	Document file (including thesis)
xlsx	Spreadsheet
CSV	Text file exported from spreadsheet
R	Files used with the statistical package "R"
jpg	Image files (figures or excerpts from model)
BED	River 2D file (see description below and details in thesis documents): Bed topography file
CDG	River 2D file: Saved river mesh as an input file for running a model.
TXT	Text files exported from spreadsheet or used to configure model.

River 2D: *brief description from website: http://www.river2d.ualberta.ca/description.htm*

Background

River2D is a two dimensional depth averaged finite element hydrodynamic model that has been customized for fish habitat evaluation studies. The River2D model suite actually consists of four programs: R2D_Bed , R2D_Ice, R2D_Mesh and River2D. All three programs have graphical user interfaces that are supported by any 32 bit version of Windows. R2D_Bed, R2D_Ice, and R2D_Mesh are graphical file editors. R2D_Bed was designed for editing bed topography data while R2D_Ice is intended for developing ice topographies to be used in the modelling of ice-covered domains. The R2D_Mesh program is used for the development of computational meshes that will ultimately be input for River2D.

These programs are typically used in succession. The normal modelling process would involve creating a preliminary bed topography file (text) from the raw field data, then editing and refining it using R2D_Bed. If an ice-covered domain were being modelled, R2D_Ice would be used to develop ice topography. The resulting bed topography file is used (inconjunction with an ice topography file where relevant) in R2D_Mesh to develop a computational discretization as input to River2D. River2D is then used to solve for the water depths and velocities throughout the discretization. Finally, River2D is used to visualize and interpret the results and perform PHABSIM type fish habitat analyses. An iterative approach at various stages, including modification of the bed topography (and ice topography), is usual.

Chapter 1: APPLICATION OF HYDRODYNAMIC MODELING TO SHORTNOSE STURGEON (*Acipenser brevirostrum*) SPAWNING HABITAT AND PASSAGE IN THE PENOBSCOT RIVER, ME

C:\\PRRT sturgeon data and readme\THESIS\Chapter 1 – modeling

Figures 1.1-1.3, 1.5, 1.8 are included as jpg files
Figure 1.4 is provided in as "discharge histogram.xlsx"; with all discharge data included
Figure 1.5 data are provided in "ComVeaKen315_44.xlsx" file

The "Point Data" folder contains ADCP point data for model calibration/validation.

CDG mesh files for River 2D are in "Bangor to Kenduskeag CDG", "Veazie to Hampden CDG" and "Veazie to Kenduskeag CDG plus" folders. *Note that the "Veazie to Hampden" model is not reported in the thesis.*

Node Attribute files (% suitability at each node in the mesh) for Passage and Spawning suitability analyses can be found in River2D1\Veazie to Kendukeag CDG plus\Node Attribute Files" folder.

Model calibration and Validation (Results 1.4) data can be found in subfolder "River2D1\ValFiles" and "River2D1\Veazie to Kendukeag CDG plus\calibration tables.xlsx".

Statistical analyses are located in the "R Files" folder.

Passage data analyses (CDG for model and extracted data) can be found in the "Passage Analysis" folder (used to generate Figure 1.9 – particularly see "PASSAGE 412-1308.xlsx").

See:

"River2D1\Veazie to Kendukeag CDG plus\PercentWUASpawning.xlsx" for Figure 1.7 graph and associated data.

"River2D1\Veazie to Kendukeag CDG plus\Passage Graphs.xlsx" for Figure 1.9 graphs and data.

Chapter 2: SHORTNOSE STURGEON REPRODUCTION AND ACOUSTIC TELEMETRY IN THE PENOBSCOT RIVER, MAINE: EVIDENCE OF A GULD OF MAINE METAPOPULATION

C:\\PRRT sturgeon data and readme\THESIS\Chapter 2 - spawning

Figures 2.1, 2.2, 2.4, 2.5 are provided as jpg files.

Figure 2.3 and associated data are found in “Spawning Figures.xlsx”

Spawning probability data (reported in Tables 2.1 and 2.2) can be found in “Spawning Figures.xlsx”

Data for shortnose sturgeon tagged with acoustic transmitters can be found in “ALL SNS tag info” in the “Matt W. SNS tags and others” worksheet. Additional tagged SNS used to calculate probabilities are found in the “SNS tags (ALL)” spreadsheet.

APPENDIX: HABITAT SUITABILITY FOR SPAWNING SHORTNOSE STURGEON: BATHYMETRIC ASSESSMENT UPSTREAM OF VEAZIE DAM

C:\\PRRT sturgeon data and readme\THESIS\Appendix – model VZ to GW

Study Area map is provided as a jpg.

River 2D was used to model the weighted usable area for spawning in this stretch. CDG files can be found in the "CDG files" folder and actual models (bed and mesh files) are found in the "Models" folder.

The "Spawning" folder contains graphic output for spawning areas based on different discharge levels.

Figure A.1 is provided as a jpg.

Figure A.2 (mesh) is provided as a jpg.

Figure A.3 (with associated data) are found in "Appendix FIGURES.xlsx".

Figure A.4 A.7are provided as jpgs.